STATEMENT OF BASIS

as required by LAC 33:IX.3109, for draft **Louisiana Pollutant Discharge Elimination System Permit No. LA0020281** to discharge to waters of the **State of Louisiana** as per LAC 33:IX.2311.

The **permitting authority** for the Louisiana Pollutant Discharge Elimination System (LPDES) is:

Louisiana Department of Environmental Quality
Office of Environmental Services
P. O. Box 4313
Baton Rouge, Louisiana 70821-4313

I. **THE APPLICANT IS:** City of Winnsboro
Winnsboro Municipal Wastewater Treatment Plant
P. O. Box 250
Winnsboro, LA 71295

II. **PREPARED BY:** Paula M. Roberts
DATE PREPARED: February 24, 2006

III. **PERMIT ACTION:** renewal of LPDES permit LA0020281/AI 43990
LPDES application received: March 7, 2005

IV. **FACILITY INFORMATION:**

A. The application is for the discharge of treated sanitary wastewater from an existing publicly owned treatment works serving the City of Winnsboro.

B. The application **does not** indicate the receipt of industrial wastewater.

C. The facility is located at 165 Davis Street; Franklin Parish, Louisiana.

D. The treatment system consist of a 1,200,000 GPD extended aeration treatment plant with bar screen, flow control structure, oxidation ditch with rotor aeration , clarifier, followed by chlorination and dechlorination, and post aeration.

In a letter dated February 1, 2005, the City of Winnsboro requested to downgrade their design capacity from 1.2 MGD to an estimated flow of 0.8 MGD. In a letter dated February 25, 2005, from Smith(DHH) to Turner(Meyer, Meyer, LaCroix & Hixson, Inc.), the request was approved. In the LPDES renewal permit application, the permittee requested that the facility be downgraded from a major facility with a design capacity of 1.2 MGD to a minor facility with an estimated flow of 0.8 MGD. The permit writer forwarded this request to Delahoussaye (technical advisor) on 12/9/05 for a formal request to EPA, Region 6 for downgrading.

On 12/15/05, spoke to Jenaie Franke (EPA) to inquire about how to handle downgrading this facility from a major facility to a minor facility. I informed her that I had forwarded the NPDES Rating Worksheets to our technical advisor on 12/9/05. She stated that she would handle it as soon as she received the worksheets. Also, she stated that she would make the request to the Washington, D.C. office, but if this facility appeared on some quarterly noncompliance report, then it could not be downgraded.

On 12/15/05, spoke to Gloria Vaugh (EPA Permits) about whether or not to route this permit as a major facility or a minor facility with the request to downgrade pending. She stated that if we will be downgrading the facility, then it should be routed as a minor permit instead of a major permit.

E. Outfall 001
Discharge Location: Latitude 32° 08 ' 46" North
Longitude 91°42' 13" West

Description: treated sanitary wastewater

The effluent from WWTPs adds dissolved solids to a stream. The wastewater from houses contain both suspended and dissolved solids. Most suspended solids are removed from water at the WWTP before being discharged to the stream, but WWTPs only remove some of the Total Dissolved Solids (TDS). Important components of the TDS load from WWTPs include phosphorus, nitrogen, and organic matter.

In an effort to gather information concerning the amount of organic and inorganic material being discharged from this facility, TDS is being is imposed as a report requirement.

Chlorides are salts resulting from the combination of the gas chlorine and various metal ions. Chlorine alone in the form of Cl_2 is very toxic. In combination with a metal ion, such as sodium and in small amounts, it becomes an essential element for normal cell function.

The common chlorides are soluble and not fixed in the soil so that they can move through the soil and into the drainage water from the following sources: 1) rocks containing chlorides; 2) agricultural runoff; 3) wastewater from industries; 4) oil well wastes; 5) effluent wastewater from wastewater treatment plants and; 6) road salting.

Despite the beneficial impaction to cell function, chlorides can contaminate fresh water streams and lakes. At high concentrations, chlorides will inhibit plant growth, as well as diminish the survival of fish and aquatic communities.

Since Chlorides is listed on the 2004 Integrated Report as a Category 3 listing and there is insufficient data to determine if the uses are being attained, a report requirement for Chlorides will be imposed in the permit. Based upon the fact that this facility has a continuous and significant flow, monitor and report is imposed in an effort to gather information concerning the amount of chlorides being discharged from this facility, if at all. This may be beneficial should Chlorides become an impairment in the future.

VI. ENDANGERED SPECIES:

The receiving waterbody, Subsegment 080906 of the Ouachita River Basin is not listed in Section II.2 of the Implementation Strategy as requiring consultation with the U. S. Fish and Wildlife Service (FWS). This strategy was submitted with a letter dated October 21, 2005 from Watson (FWS) to Gautreaux (LDEQ). Therefore, in accordance with the Memorandum of Understanding between the LDEQ and the FWS, no further informal (Section 7, Endangered Species Act) consultation is required. It was determined that the issuance of the LPDES permit is not likely to have an adverse effect on any endangered or candidate species or the critical habitat. The effluent limitations established in the permit ensure protection of aquatic life and maintenance of the receiving water as aquatic habitat.

VII. HISTORIC SITES:

The discharge is from an existing facility location, which does not include an expansion beyond the existing perimeter. Therefore, there should be no potential effect to sites or properties on or eligible for listing on the National Register of Historic Places, and in accordance with the "Memorandum of Understanding for the Protection of Historic Properties in Louisiana Regarding LPDES Permits" no consultation with the Louisiana State Historic Preservation Officer is required.

VIII. PUBLIC NOTICE:

The public notice is published in the local newspaper of general circulation and the Office of Environmental Services Public Notice Mailing List. Upon publication of the public notice, a public comment period shall begin on the date of publication and last for at least 30 days thereafter. During this period, any interested persons may submit written comments on the draft permit to the LDEQ contact person, listed below, and may request a public hearing to clarify issues involved in

Estimated Flow: 0.8 MGD

Type of Flow Measurement that the facility is currently using: V-notch weir with Combination totalizing meter/Continuous recorder

V. RECEIVING WATERS:

The discharge from Outfall 001 is from an effluent pipe, thence into an unnamed tributary, thence into Turkey Creek in segment 080906 of the Ouachita River Basin. This segment is listed on the 303(d) list of impaired waterbodies.

The designated uses and degree of support for Segment 080906 of the Ouachita River Basin are as indicated in the table on the next page[1/]:

Overall Degree of Support for Segment 080906	Degree of Support of Each Use						
Partial	Primary Contact Recreation	Secondary Contact Recreation	Propagation of Fish & Wildlife	Outstanding Natural Resource Water	Drinking Water Supply	Shell fish Propagation	Agriculture
	Full	Full	Not	N/A	N/A	N/A	N/A

[1/]The designated uses and degree of support for Segment 080906 of the Ouachita River Basin are as indicated in LAC 33:IX.1123.C.3, Table (3) and the 2002 Water Quality Management Plan, Volume 5, Part B, Water Quality Inventory respectively.

Subsegment 080906, Turkey Creek – From Turkey Creek Cutoff to Turkey Creek Lake, is listed on LDEQs Final 2004 Integrated Report as being impaired for Dissolved Oxygen. Although TMDLs for the Ouachita River Basin were due to be completed by 2001, a TMDL has not yet been developed for Dissolved Oxygen. It was first placed on the 303(d) list in 2002. A TMDL will be scheduled following completion of the EPA Consent Decree TMDL schedule. TDS and Chlorides are also listed on the 2004 Integrated Report as a Category 3 listing, which means there is insufficient data to determine if any uses and standards are being attained. To date no TMDLs have been established for this waterbody to address Chlorides and Total Dissolved Solids. A reopener clause will be placed in the permit to allow for the requirement of effluent limitations and other requirements as imposed by any future TMDLs. Therefore, TDS and Chlorides are addressed in this permit.

$CBOD_5$ is used as a method to measure the amount of dissolved oxygen in the waste stream utilized by organisms during the decomposition of organic material over a five day period (when ammonia nitrogen is a requirement of the permit). Therefore, to protect against the potential for discharges of material that would result in DO at levels below that of state water quality standards, $CBOD_5$ and Ammonia limits have been placed in the permit.

TDS is a measure of the amount of material dissolved in water. This material can include carbonate, bicarbonate, chloride, sulfate, phosphate, nitrate, calcium, magnesium, sodium, or organic ions and other ions. A certain level of these ions in water is necessary for aquatic life. If TDS concentrations are too high or too low, the growth of many aquatic life can be limited, and death may occur.

the permit decision. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing.

Public notice published in:

Local newspaper of general circulation
Department of Environmental Quality Public Notice Mailing List

For additional information, contact:

Ms. Paula M. Roberts
Permits Division
Department of Environmental Quality
Office of Environmental Services
P. O. Box 4313
Baton Rouge, Louisiana 70821-4313

IX. PROPOSED PERMIT LIMITS:

OUTFALL 001

Final effluent limits shall become effective on the effective date of the permit and expire on the expiration date of the permit.

Final Effluent Limits:

Effluent Characteristic	Monthly Avg. (lbs./day)	Monthly Avg.	Weekly Avg.	Basis
$CBOD_5$	66.72	10 mg/l	15 mg/l	Previous permit limits based upon the Statewide Sanitary Effluent Limitations Policy (SSELP) in accordance with the Ouachita River Basin Plan for facilities this size
TSS	100	15 mg/l	23 mg/l	Since there is no numeric water quality criterion for TSS, and in accordance with the current Water Quality Management Plan, the TSS effluent limitations shall be based on a case-by-case evaluation of the treatment technology being utilized at a facility. Therefore, a Technology Based Limit has been established through Best Professional Judgment for the type of treatment technology utilized at this facility.
Ammonia-Nitrogen	33.4	5 mg/l	10 mg/l	Previous permit limit based upon the Statewide Sanitary Effluent Limitations Policy (SSELP) in accordance with the Ouachita River Basin Plan for facilities of this size
TDS	N/A	Report	Report	Best Professional Judgment based upon listing on LDEQ's 2004 Integrated Report dated August 17, 2005

Effluent Characteristic	Monthly Avg. (lbs./day)	Monthly Avg.	Weekly Avg.	Basis
Chlorides	N/A	Report	Report	Best Professional Judgment based upon listing on LDEQ's 2004 Integrated Report dated August 17, 2005

Other Effluent Limitations for Outfall 001

1) **Fecal Coliform**

The discharge from this facility is into a water body which has a designated use of Primary Contact Recreation. According to LAC 33:IX.1113.C.5.b.i, the fecal coliform standards for this water body is 200/100 ml and 400/100 ml. Therefore, the limits of 200/100 ml (Monthly Average) and 400/100 ml (Weekly Average) are proposed as Fecal Coliform limits in the permit. These limits are being proposed through Best Professional Judgment in order to ensure that the water body standards are not exceeded, and due to the fact that existing facilities have demonstrated an ability to comply with these limitations using present available technology.

2) **pH**

According to LAC 33:IX.3705.A.1., POTW's must treat to at least secondary levels. Therefore, in accordance with LAC 33:IX.5905.C., the pH shall not be less than 6.0 standard units nor greater than 9.0 standard units at any time.

3) **Solids and Foam**

There shall be no discharge of floating solids or visible foam in other than trace amounts in accordance with LAC 33:IX.1113.B.7.

4) **Priority Pollutants**

A review of the Discharge Monitoring Reports revealed values are still being reported for the pollutants Hexavalent Chromium and Aldrin (see DMR Review-Values are reported in pounds per day (lbs/day). Using data reported for the monitoring period August 2003 through August 2005, a geometric mean was calculated using the values listed below for the two pollutants and examined in accordance with the implementation procedures outlined under the Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards, September 27, 2001, Version 4. (Please see Appendix B-1, Water Quality Screen Spreadsheet)

Hexavalent Chromium	Aldrin
<0.06	**0.0001**
<0.031	**0.0000083**
<0.05	**0.00013**
<0.035	**0.00001**
7.5	**0.18**
GM = 0.1703	**GM = 0.000461**

Effluent Characteristic	Monthly Avg. (lbs./day)	Daily Maximum (lbs./day)	Basis
Hexavalent Chromium	0.045	0.11	Water Quality Based Limit
Aldrin	0.000090	0.00021	Water Quality Based Limit

X. **PREVIOUS PERMITS:**

LPDES Permit No. LA0020281: Issued: April 16, 2000
Effective: May 1, 2000
Expired: April 15, 2005

Interim effluent limits beginning the effective date of the permit and lasting three years from the effective date of the permit Design 1.2 MGD

Effluent Characteristic	Discharge Limitations			Monitoring Requirements	
	lbs./day	other units			
	Monthly Avg.	Monthly Avg.	Weekly Avg.	Measurement Frequency	Sample Type
Flow	---	Report	Report	Continuous	Recorder
$CBOD_5$	100	10 mg/l	15 mg/l	2/month	6-hr. comp
TSS	100	15 mg/l	23 mg/l	2/month	6-hr. comp
Ammonia-Nitrogen	50	5 mg/l	10 mg/l	2/month	6-hr. comp
Fecal Coliform Colonies	N/A	200	400	2/month	Grab
Total Residual Chlorine	N/A	---	---	2/month	Grab
pH	---	6-9 Standard Units		2/month	Grab

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	lbs/day Monthly Avg.	lbs./day Daily Max	Measurement Frequency	Sample Type
Hexavalent Chromium	Report	Report	1/quarter	6-hr. comp.
Aldrin	Report	Report	1/quarter	6-hr. comp.

	Monthly Avg. Min.	7-Day Avg. Min.	Measurement Frequency	Sample Type
Biomonitoring (Chronic)				
Ceriodaphnia dubia	Report	Report	2/year	24-hr. comp.
Pimephales promelas	Report	Report	1/year	24-hr. comp.

Final effluent limits beginning three years from the effective date of the permit and lasting through the expiration date of the permit Design 1.2 MGD

Effluent Characteristic	Discharge Limitations			Monitoring Requirements	
	lbs./day	other units			
	Monthly Avg.	Monthly Avg.	Weekly Avg.	Measurement Frequency	Sample Type
Flow	---	Report	Report	Continuous	Recorder
$CBOD_5$	100	10 mg/l	15 mg/l	2/month	6-hr. comp
TSS	100	15 mg/l	23 mg/l	2/month	6-hr. comp
Ammonia-Nitrogen	50	5 mg/l	10 mg/l	2/month	6-hr. comp
Fecal Coliform Colonies	N/A	200	400	2/month	Grab
Total Residual Chlorine	N/A	---	---	2/month	Grab
pH	---	6-9 Standard Units		2/month	Grab

	lbs/day Monthly Avg.	lbs./day Daily Max	Measurement Frequency	Sample Type
Hexavalent Chromium	0.068	0.16	1/quarter	6-hr. comp.
Aldrin	0.000091	0.00022	1/quarter	6-hr. comp.

	Monthly Avg. Min.	7-Day Avg. Min.	Measurement Frequency	Sample Type
Biomonitoring (Chronic)				
Ceriodaphnia dubia	Report	Report	2/year	24-hr. comp.
Pimephales promelas	Report	Report	1/year	24-hr. comp.

This permit contained a compliance schedule.
This permit contained pretreatment requirements.
This permit contained pollution prevention requirements.
This permit contained biomonitoring requirements.

XI. ENFORCEMENT AND SURVEILLANCE ACTIONS:

A) Inspections

A review of EDMS indicates the following inspections were performed during the period beginning **September 2003** and ending **September 2005** for this facility.

Date – May 18, 2005
Inspector(s) – John Posey, LDEQ/Northeast Regional Office
Findings and/or Violations:

A compliance evaluation inspection was conducted to determine adherence with the permit. The following items were found:

1. Facility consist of a large one cell oxidation pond, clarifiers, racetrack, and contact chamber. Facility services the Town of Winnsboro. The permit was effective on May 1, 2000 and expired on April 30, 2005.
2. The oxidation pond appeared well-maintained. One of the secondary clarifiers was bypassed and empty due to a project to install a staff gauge near the 90° v-notch weir. The staff gauge should be installed to allow accurate period checks of the flow meter accuracy. Currently, a ruler is used from the bottom of the V-notch wier to the top of the water. Flow meter and weir were calibrated on 1/27/04 by an outside party.
3. Records and Reports were up to date. A search of DMRs revealed there were no maximum limit exceedances of the effluent since the 3/23/04 inspections. However, there were two exceedances of the TSS monthly average. January 05- 17.6 ppm (permit limit -15ppm), September 04-15.1 ppm.
4. Holes are present in the curtain wall in both of the clarifiers (southern most).
5. Permittee is not writing down the actual TRC value.
6. Annual environmental audit submitted 3/29/05.

Date – March 23, 2004
Inspector(s) – Madelon Carter, LDEQ/Northeast Regional Office
Findings and/or Violations:

A compliance evaluation inspection was conducted to determine the facility's compliance with the LAC 33:IX. Water Quality Regulations. The following items were found:

1. The $CBOD_5$ parameter was exceeded for the month and year of 11/03.
2. The Aldrin parameter was exceeded for the quarter of 11/03-01/04.
3. The Hexavalent Chromium parameter was exceeded for the quarter of 08/03-10/03.
4. The flow measure calibration frequency was inadequate; whereas, the last calibration was over a year (i.e. 10/07/02).

Date – March 27, 2003
Inspector(s) – Madelon Carter, LDEQ/Northeast Regional Office
Findings and/or Violations:

A compliance evaluation inspection was conducted to determine the facility's compliance with the LAC 33:IX. Water Quality Regulations. The following items were found:

1. The monthly average and weekly average concentration limits for Ammonia-nitrogen were exactly the same for the months and years of 003/02, 08/02, and 01/03.
2. The monthly average and weekly average concentration limits for fecal coliform were exactly the same for the months and years of 12/02 and 02/03.
3. The $CBOD_5$ parameters were exceeded for the months and years of 12/02 and 01/03.
4. The measurement frequency for Ammonia-Nitrogen and fecal coliform is twice per month. Final outfall discharge was clear and devoid of solids.

B) Compliance and/or Administrative Orders

A review of EDMS and TEMPO revealed the following enforcement actions(active) administered against this facility from the period beginning **October 2003** through **October 2005**:

LDEQ Issuance:
Docket # - WE-L-05-0442
Issued – September 28, 2005
The letter informed the facility that on or about May 18, 2005 an inspection was conducted to determine compliance with the Louisiana Environmental Quality Act and supporting regulations. The inspection report, noted areas of concern was forwarded to the Enforcement Division and that all violations would be taken into consideration in determining further actions. The letter also informed the permittee that immediate steps needed to be taken to ensure compliance with all environmental regulations at their facility.

Docket # - WE-L-03-0334
Issued – April 20, 2005
The letter informed the facility that on or about March 27, 2003 and March 23, 2004 that inspections were conducted to determine compliance with the Louisiana Environmental Quality Act and supporting regulations. The inspection reports, noting areas of concern were forwarded to the Enforcement Division and that all violations would be taken into consideration in determining further actions. The letter also informed the permittee that immediate steps needed to be taken to ensure compliance with all environmental regulations at their facility.

EPA Issuance: None

C) DMR Review

A review of the discharge monitoring reports for the period beginning **August 2003** through **August 2005** has revealed the following violations:

Effluent Characteristic	Number of Violations
$CBOD_5$ Mon. Avg.- (concentration)	2
TSS Mon. Avg. – (concentration)	2
Hexavalent Chromium Avg.(mass limits)	1
Aldrin Avg. (mass limits)	4
Aldrin Max (mass limits)	2

A detailed report is attached.

XII. ADDITIONAL INFORMATION:

As a part of the LPDES renewal application, the permittee requested that the facility be downgraded from a major facility with a design capacity of 1.2 MGD to a minor facility with an estimated flow of 0.8 MGD. Documentation included a letter from the regional engineer with DHH and a history of the facility's daily effluent flows from January 2003 through November 2004. The permit writer forwarded this request to the technical advisor on 12/9/05 for a formal request to EPA, Region 6 for downgrading. As of 2/24/06, this facility has not been downgraded to a minor facility.

Due to the fact that this facility is being downgraded from a major facility to a minor facility, the Biomonitoring test(s) for the last five year period were reviewed and revealed no toxicity failures. This information coupled with the facility's estimated flow being below 1.MGD, biomonitoring has been removed from this permit.

Final effluent loadings (i.e. lbs/day) have been established based upon the permit limit concentrations and the design capacity flow of 0.8 MGD. Effluent loadings are calculated as shown in the following example:

$CBOD_5$ = 8:34 x 0.8 x 10 mg/l = 66.72 lbs/day

The monitoring frequency in the previous permit was reduced from 2/week to 2/month in accordance with the ***Interim Guidance for Performance-Based Reduction of NPDES Permit Monitoring Frequencies Document***. The criteria used to evaluate the eligibility for a reduction in the monitoring frequency includes: facility enforcement history, parameter-by-parameter compliance history, and parameter-by-parameter performance history. Continued eligibility for this reduction is contingent on the continued monitoring for each parameter for significant non compliance and any effluent violations of critical parameters, failure to submit DMRs, and any new enforcement actions. If any of these situations occur, the Department has the authority to increase the monitoring frequency. Based upon the DMR review and enforcement history for this facility, the monitoring frequency has been increased. The **Monitoring Requirements, Sample Types, and Frequency of Sampling** for facilities with flows of 0.5 MGD to 1.0 MGD are 1/week:

Effluent Characteristics	Monitoring Requirements	
	Measurement Frequency	Sample Type
Flow	Continuous	Recorder
$CBOD_5$	1/week	3-hr. composite
Total Suspended Solids	1/week	3-hr. composite
Fecal Coliform Bacteria	1/week	3-hr. composite
Ammonia-Nitrogen	1/week	3-hr. composite
TDS	1/quarter	Grab
Chlorides	1/quarter	Grab
Hexavalent Chromium	1/quarter	24-hr. composite
Aldrin	1/quarter	24-hr. composite
pH	1/week	Grab

Pollution Prevention Requirements:

The permittee shall institute or continue programs directed towards pollution prevention. The permittee shall institute or continue programs to improve the operating efficiency and extend the useful life of the facility. The permittee will complete an annual Environmental Audit Report each year for the life of this permit according to the schedule below. The permittee will accomplish this requirement by completing an Environmental Audit Form which has been attached to the permit. Please make additional copies to be utilized for each year of this permit.

The audit evaluation period is as follows:

Audit Period Begins	Audit Period Ends	Audit Report Completion Date
Effective Date of Permit	12 Months from Audit Period Beginning Date	3 Months from Audit Period Ending Date

XIII. TENTATIVE DETERMINATION:

On the basis of preliminary staff review, the Department of Environmental Quality has made a tentative determination to reissue a permit for the discharge described in this Statement of Basis.

XIV. REFERENCES:

Louisiana Water Quality Management Plan, Vol. 8, Appendix A, "Areawide Effluent Limitations Policy", Louisiana Department of Environmental Quality, 2005.

Louisiana Water Quality Management Plan, Vol. 5, Part B, "Water Quality Inventory", Louisiana Department of Environmental Quality, 2002 and 2004.

Louisiana Administrative Code, Title 33 - Environmental Quality, Part IX - Water Quality Regulations, Chapter 11 - "Louisiana Surface Water Quality Standards", Louisiana Department of Environmental Quality, 2005.

LA 2004 Integrated Report with FINAL EPA Additions, August 17, 2005.

Louisiana Administrative Code, Title 33 - Environmental Quality, Part IX - Water Quality Regulations, Chapter 23 - "The LPDES Program", Louisiana Department of Environmental Quality, 2005.

Low-Flow Characteristics of Louisiana Streams, Water Resources Technical Report No. 22, United States Department of the Interior, Geological Survey, 1980.

Index to Surface Water Data in Louisiana, Water Resources Basic Records Report No. 17, United States Department of the Interior, Geological Survey, 1989.

LPDES Permit Application to Discharge Wastewater, City of Winnsboro, Winnsboro Municipal Wastewater Treatment Plant, March 7, 2005.

BASIN: General Information on Total Suspended Solids, City of Boulder/USGS Water Quality Monitoring, Sheila Murphy, Research Analyst, last update June 15, 2002, http://www.bcn.boulder.co.us/basin/data/FECAL/info/TSS.html.

How Pure Is Your Water? 1997 - 2000 Sunstone Industries, last modified January 13, 2005, Sunstone Herbals, http://sunstoneherbals.com/tds3.htm.

Chloride and water quality, http://kywater.org/ww/ramp/rmcl.htm.

Understanding Water Quality, MDS Harris Laboratory Services-Technical Bulletins,copyright 2000-2003 by MDS Harris, http://www.ag.mdsharris.com/education_train/water_quty.asp.

REFERENCES continued:

RESOURCES: Technically Speaking: Salts, Chlorides and Deicers, by Jeff Swano, Exec. Dir. of the Salt Creek Watershed Network, The Ladd Arboretum and Evanston Ecology Center, last updated September 1, 2005, http://www.laddarboretum.org/resources_salt.htm.

Water Pollution, Forms of water pollution, http://www.italocorotondo.it/tequila/module2/pollution/forms_water_pollution.htm.

Stream flow data from Louisiana Pollutant Discharge Elimination System (LPDES) permit, Town of Winnsboro, Winnsboro Wastewater Treatment Plant, issued May 1, 2000.